

Encouraging Resident Adverse Event Reporting: A Qualitative Study of Suggestions from the Front Lines

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ABSTRACT

Introduction: Little is known about what motivates residents to report adverse events. The goals of the qualitative study were to: (1) better understand facilitators to residents' event reporting and (2) identify effective interventions that encourage residents to report.

Methods: The authors conducted focus groups of upper-level residents from 4 training programs (2 internal medicine, a pediatric, and a combined medicine-pediatric) who rotated at 3 institutions within a large healthcare system in 2016. Quantitative data on reporting experience were gathered. Focus groups were audio recorded and transcribed. Two coders reviewed transcripts using the editing approach and organized codes into themes. **Results:** Sixty-four residents participated in 8 focus groups. Residents were universally exposed to reportable events and knew how to report. Residents' reporting behavior varied by site according to local culture, with residents filing more reports at the pediatric hospital compared to other sites, but all groups expressed similar general views about facilitators to reporting. Facilitators included familiarity with the investigation process, reporting via telephone, and routine safety educational sessions with safety administrators. Residents identified specific interventions that encouraged reporting at the pediatric hospital, including incorporating an attending physician review of events into sign-out and training on error disclosure. **Conclusions:** This study provides insight into what motivates resident event reporting and describes concrete interventions to increase reporting. Our findings are consistent with the Theoretical Domains Framework of behavioral change. These strategies could prove successful at other pediatric hospitals to build a culture that values reporting and prepares residents as patient safety champions. (*Pediatr Qual Saf* 2019;3:e167; doi: 10.1097/pq9.000000000000167; Published online April 12, 2019.)

INTRODUCTION

Because the Institute for Medicine's "To Err is Human"¹ called for healthcare providers' engagement in event reporting to improve patient safety, most US hospitals have established event reporting systems.² Despite these efforts, published data estimate medical errors as a leading cause of death,³ and reporting systems fail to capture many significant events.⁴ Reporting data show that physicians file 2%–4% of all event reports in the inpatient setting,^{5–7} and

experts have identified this lack of involvement as a reason why reporting systems have not been more successful in improving hospital safety.⁸

Residents are the front-line providers at teaching hospitals. Almost all residents recognize exposure to adverse events and near misses during training,^{9–12} although few submit a Patient Safety Occurrence Report (PSOR).^{9–11,13,14} Increasing reporting can highlight previously unidentified systematic issues and potentially improve patient



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care.¹⁵⁻¹⁷ A goal of the Accreditation Council for Graduate Medical Education's Clinical Learning Environment Review¹⁸ program is to develop trainees' reporting behaviors in residency to be carried forward throughout their careers.

Despite the importance of engaging trainees in event reporting, little is known about what interventions encourage resident reporting. Most data are from surveys and focus on reporting barriers.^{9-11,13,14,19} Minimal research has investigated facilitators to resident reporting, and what exists mostly involves asking survey respondents which hypothetical interventions would be most effective.^{9,11,13} Two literature reviews^{16,20} identified motivators to resident reporting such as feelings of personal and professional integrity, responsibility to the patient, and the potential to improve the care of future patients. They suggested interventions such as changing organizational culture, providing reporting feedback, introducing safety curricula, and engaging faculty role models to encourage resident reporting but gave few concrete examples of how to do so. The reviews called for more research into motivators to reporting and why some hospital cultures are more encouraging of resident reporting than others.

Our healthcare system supports a large graduate medical education training program at multiple hospitals, all of which utilize the same electronic reporting system. Each hospital has its own unique patient safety team that investigates PSORs, but the organization of these teams and the general approach to report follow-up is similar at all hospitals within the system. Our hospital system does not offer an incentive system for resident reporting. Residents at our pediatric hospital file PSORs at approximately twice the rate of residents at other hospitals in the system, in part due to a successful multifaceted effort by our pediatric training program to increase resident reporting.²¹ Our goals were to: (1) better understand facilitators to residents' event reporting in general and (2) identify specific interventions that residents found effective in creating a culture of reporting. We chose a focus group study to achieve these aims. Focus groups are excellent for learning about the knowledge and experiences of members of a group, exploring group norms, and understanding complex behaviors.²²

METHODS

Our study included residents rotating at 3 hospitals from 4 Accreditation Council for Graduate Medical Education accredited residency programs. The hospitals were a large, urban tertiary-care referral center [internal medicine 1 (IM1)], a smaller hospital serving as a specialized cancer referral center and community-based academic center (IM2), and a large pediatric referral hospital (PED). The residency programs included: (1) a categorical IM program (115 residents) rotating at IM1; (2) a categorical IM program (36 residents) rotating primarily at IM2 and IM1; (3) a combined internal medicine-pediatrics (MP)

program (a 16 resident, 4-year program) rotating at all three hospitals; and (4) a categorical pediatrics program (83 residents) rotating at PED. Each hospital utilizes the Riskmaster (Computer Sciences Corporation, Falls Church, Va.) reporting system and employs a similar investigative process for filed reports.

Recruitment

We conducted 8 focus groups, with 2 groups from each residency program, during February and March of 2016. We recruited participants via email and direct contact by investigators. The only incentive provided for participation was lunch.

Group Structure

Each focus group consisted of residents from a single training program to encourage consistency and candid discussion. Only postgraduate year 2 and above residents were included to ensure adequate understanding of their primary hospital's underlying culture and norms.

Quantitative Data Collection

Before starting each focus group, participants completed a brief survey (see Supplemental Digital Content 1, which shows the prefocus group survey, <http://links.lww.com/PQ9/A80>). Residents received written definitions of the terms adverse event, near miss, and medical error. Participants were asked about their knowledge of how to file a report, to quantify their experience with safety events and event reporting, and to estimate their likelihood of filing a report if an adverse event were to happen to one of their patients.

Focus Group Structure and Qualitative Data Collection

Discussion was facilitated by an experienced third-party moderator using a pilot-tested guide developed collaboratively by team members with expertise in patient safety, qualitative methods, and medical education. The discussion guide primed residents by asking them to recall a near miss or adverse event in their hospital. The moderator asked participants: (1) what they did when an event occurred; (2) what they considered a reportable event; (3) barriers and drivers to event reporting; and (4) what interventions had encouraged them to report (or would make them more likely to report in the future). The discussion provided time for feedback and recommendations by participants. Focus groups lasted 60 minutes and were audio recorded then transcribed verbatim. An investigator observed each session, taking notes on nonverbal cues and group dynamics to augment transcriptions. Both the moderator and notetaker thought that thematic saturation was reached at the end of the focus groups.

The institutional review board of the University of Pittsburgh determined participation in this study to have minimal risk and waived the need for written informed consent.

Analysis

For quantitative analysis, we used Fisher's exact tests for categorical variables and the Kruskal–Wallis test for continuous variables to assess whether any statistically significant differences existed between the residency training programs. All statistical analysis was done with Stata SE 14.2 (StataCorp LLC, College Station, Tex.).

For qualitative analysis, 2 researchers each individually reviewed the same four transcripts using Atlas.ti 7.0 (Scientific Software Development GmbH, Berlin, Germany), developing codes using the “editing approach” described by Crabtree and Miller.²³ After coding each transcript individually, they reviewed the codes, merged them into common themes, and agreed on code definitions. A codebook was generated and revised iteratively based on consensus. Following pilot coding, the final codebook was applied independently by each coder to the remaining 4 transcripts. The coders adjudicated any disagreement until they agreed. To ensure methodological rigor in interpretation, coders utilized investigator triangulation through discussion of results and a topic-naïve facilitator to reduce bias in data collection.

RESULTS

A total of 64 residents participated in focus groups, with 62 residents providing demographic information (Table 1). All respondents (100%) had been exposed to adverse events or near misses. Nearly all residents (95%) had at least a fair understanding of how to file a PSOR. Most residents (90%) filed at least one PSOR during their residency, and a majority (56%) filed a report in the last 6 months. There were statistically significant ($P < 0.05$)

differences between the various residency programs in terms of gender, knowledge of how to report, events experienced, and reports filed. Descriptive data showed that pediatric residents had a higher proportion of female residents, reported a greater understanding of how to report, greater exposure to reportable events, and endorsed filing more reports than the other groups.

Respondents reported that exposure to distinct cultures at each hospital influenced their reporting behaviors. However, their general views about facilitators to event reporting were similar across all groups and are reported in aggregate for general themes. Some themes represented technical factors related to the reporting system, whereas most themes related to hospital culture and the handling of event reports. These themes are summarized, with exemplary quotes, in Table 1, Supplemental Digital Content 2, <http://links.lww.com/PQ9/A79>.

Facilitators Related to Technical Factors

Residents described mixed feelings about the established reporting system. Features such as autopopulating demographic information and minimizing mandatory click boxes increased their likelihood of reporting, although residents felt that reporting took too long. Residents can file PSORs via a telephone system, which some focus groups identified as more convenient than computerized reporting.

A Culture of Safety and Proven Strategies to Build a Culture of Reporting

Residents identified the importance of an institution's underlying culture of safety to their reporting behavior. An MP resident described:

Table 1. Demographic Information and Experience with Event Reporting of Resident Focus Group Participants by Training Program

Training Program	IM1	IM2	Pediatrics	Internal Medicine-Pediatrics	P value
Participants	16*	17	17	12	
Male sex (%)	7 (44%)	9 (53%)	2 (12%)	6 (50%)	0.047†
Average age (SD)	28.9 (1.3)	28.8 (2.8)	29.4 (2.3)	29.9 (1.7)	0.11‡
Postgraduate year-2 (%)	7 (44%)	8 (47%)	6 (35%)	4 (33%)	0.86†
Knowledge of how to file a report					0.003†
Very poor or poor	1 (6%)	2 (12%)	0 (0%)	0 (0%)	
Fair	5 (31%)	7 (41%)	0 (0%)	1 (8%)	
Good or excellent	10 (63%)	8 (47%)	17 (100%)	11 (92%)	
Adverse events or near misses experienced over course of residency					0.014†
0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1–3	3 (19%)	8 (47%)	1 (6%)	1 (8%)	
4–6	5 (31%)	5 (29%)	2 (12%)	5 (42%)	
>6	8 (50%)	4 (24%)	14 (82%)	6 (50%)	
Reports filed during course of residency					<0.001†
0	2 (13%)	4 (24%)	0 (0%)	0 (0%)	
1–3	6 (38%)	9 (53%)	1 (6%)	6 (50%)	
4–6	5 (31%)	4 (24%)	2 (12%)	4 (33%)	
>6	3 (19%)	0 (0%)	14 (82%)	2 (17%)	
Likelihood of filing a report if an adverse event occurred to a patient in their care					0.13†
0%–25%	3 (19%)	7 (41%)	1 (6%)	2 (17%)	
26%–50%	3 (19%)	3 (18%)	0 (0%)	2 (17%)	
51%–75%	6 (38%)	3 (18%)	6 (35%)	4 (33%)	
>75%	4 (25%)	4 (24%)	10 (59%)	4 (33%)	

*While 18 residents participated in these focus groups, 2 participants did not complete the survey.

†Fisher's exact test for independent samples.

‡Kruskal–Wallis test.

One thing I really notice strongly when I switch between the adult and peds worlds is that I think at PED there's a really strong culture of everybody should [report] all the time! And they're constantly reminding you, Report! Report! Report! I think I've thought of [reporting] more just as a result of that... I feel like the culture of safety at PED is a lot stronger than it is at [the other hospitals].

Residents who rotated at multiple sites frequently noted such cultural variation between hospitals which affected their behaviors. An MP resident said:

In a lot of ways we are forced to try to be chameleons.... We try to approximate the setting where we are.

Added another MP resident:

I think that in some ways... my culture is more medicine on the medicine-side and more peds on the peds-side.

Establishing a culture of safety and reporting is not easy. As one resident explained, just talking about reporting is not enough:

One thing is reminding and vocalizing about the importance of reporting, and another one is actually creating an environment and a climate that supports the reporting.

The residents in our focus groups who rotated at PED identified specific processes that they felt contributed to this culture, which are described below.

Handling of the Investigation

Residents stressed the importance of feeling that the reporting process is safe; not just from “formal” censure from the hospital or training program but also reprimand from other team members. Despite using the same general investigation process, there were different perceptions about the safety of reporting at the hospitals represented in our focus groups. An MP resident described:

I think at [PED] the culture is more that you should report things; there's way less of a feeling that you could be penalized for it. Most of our stories where we get some pushback is coming from [the other hospitals], I've never heard of anyone at [PED] hearing directly from an [angry] nursing unit about [a PSOR].

Follow-up on reports and transparency of the reporting process are paramount. Residents were encouraged when they received follow-up on their reports or recognized changes to the system:

I think PED makes a concerted effort to...make [feedback] more visible to residents, in terms of what they do with the reports, and what changes have been made.... Whereas I have zero idea of it at [the adult hospitals], I don't think that's made as transparent.

Residents also felt that participating in the postreport investigative process shows reports are taken seriously and reinforces the value of reporting.

Role Modeling

Residents identified the importance of role modeling for establishing a reporting culture. Residents are often initially taught how to report by other residents; attendings then reinforce the behavior through positive feedback and role modeling. PED made a change to ensure that all attendings, regardless of their interest or knowledge about patient safety, role modeled reporting to residents:

Our attendings have started...asking us every morning whenever we're signing out, as the night team, "Are there any patient safety events that occurred overnight?" Sometimes that would be the moment when you realize that there actually was a patient safety event... I should have [reported] that.

This practice reinforces that the hospital values reporting and normalizes discussing and reporting adverse events.

Routine Safety Education

PED has 2 monthly morning report sessions dedicated to patient safety, one for interns focused on establishing a culture of safety and another for senior residents focused on teaching principles of safety. Aside from the educational value, dedicating a conference to safety establishes patient safety as a priority and normalizes talking about errors. Said one MP resident:

On the peds side [there's a conference series] for the interns that's...just about talking about errors that you made and how it made you feel. That's totally different; there's nothing like that on medicine.

The sessions also provide a forum for giving residents feedback about PSORs:

I really like at safety rounds when we hear about the changes that have come about from multiple [PSORs] because that reinforces the need to keep filing them.

Familiarity with Safety Staff and Administration

Residents noted safety staff and administration at PED regularly attended resident safety conferences. This increased residents' familiarity with safety leadership and comfort with reporting. One resident described safety rounds:

It's an informal setting where we can bring up [safety] concerns... because you know it's a safe environment and then the [administrators can] take that to their meeting also.

Error Disclosure Training

At PED, all residents receive training on error disclosure to patients and their families utilizing standardized patients. Part of this disclosure process includes explaining to families that the medical team will file a PSOR. Residents felt this simulated disclosure process increased reporting of real adverse events. Residents also described that disclosing errors to families was cathartic:

A way to accept responsibility for your mistake and move on from it, as opposed to having it linger and bug you.

DISCUSSION

Engaging residents in event reporting is a priority for graduate medical educators. Our qualitative study investigated residents’ perceived facilitators to reporting. Establishing a local culture of safety is paramount to resident reporting, as shown by the fact that the same residents using the same PSOR system endorsed different behaviors based on the culture of the hospital where they were rotating. Our study highlights specific interventions that residents found successful in building a reporting

culture such as role modeling by faculty, providing follow-up on PSORs and the investigative process, and training residents in error disclosure. These interventions could prove successful at other institutions.

Our findings align with the Theoretical Domains Framework (TDF) of behavioral change.²⁴ This validated^{24,25} theoretical framework recognizes the complexity of behavioral change and has been used to study the implementation of healthcare interventions in several countries.^{26,27} The TDF has identified 14 domains that affect behavior, and which map nicely to the Behavioral Change Wheel’s Capability, Opportunity, Motivation system for designing behavioral interventions.^{24,28} Table 2

Table 2. Resident Identified Implementable Strategies to Increase Adverse Event Reporting; Mapped to Relevant Domains of the Capability, Opportunity, and Motivation System of the Behavioral Change Wheel and the Theoretical Domains Framework of Behavioral Change

COM-B Component	TDF Domain	Intervention	Other Associated TDF Domains
Capability	Knowledge	Create multidisciplinary educational conferences dedicated to patient safety; include report follow-up as part of these	Skills; Social/Professional role and identity; Optimism; Beliefs about consequences; Reinforcement; Environmental context and resources; Social influences; Behavioral regulation
	Skills	Give hands-on demonstrations of how to report	Knowledge; Behavioral regulation
	Memory, attention, and decision process	Build reporting into work rounds to routinize the behavior	Memory, attention, and decision processes; Behavioral regulation
	Behavioral regulation	Provide more than one method of reporting, such as telephone reporting in addition to electronic reports, to facilitate quick reporting when residents are busy	Environmental context and resources; Behavioral regulation
Opportunity	Behavioral regulation	Ask faculty to discuss reporting regularly on rounds; consider scripted questions like, “What safety events occurred last night?”	Social influences; Social/professional role and identity
	Social influences	Role model reporting; ask faculty to report with residents or discuss reports they have filed	Social/professional role and identity; Behavioral regulation
	Environmental context and resources	Invite administrators and patient safety staff to resident conferences so residents know who they are reporting to	Social/professional role and identity; Beliefs about consequences; Environmental context and resources
Motivation	Social professional role and identity	Simplify the error reporting system to require the minimum amount of information needed to investigate an incident, using autopopulation from the electronic medical record when possible	Skills; Memory, attention, and decision processes; Beliefs about capabilities; Behavioral regulation
	Beliefs about capabilities	Provide education about reporting, preferably discussion based, so residents can share ideas and change group norms	Knowledge; Skills; Beliefs about capabilities; Intentions; Environmental context and resources; Social influences
	Optimism	Encourage reporting even small events, as familiarity with the system increases reporting	Knowledge; Skills; Behavioral regulation
	Beliefs about consequences	Provide follow-up on reports following completion of the investigation, so residents see the benefits to reporting	Reinforcement; Beliefs about consequences; Goals; Environmental context and resources
	Intentions	Involve residents in the investigative process by inviting them to meetings where reports are discussed and root cause analyses	Reinforcement; Goals; Environmental context and resources
	Goals	Provide a consistent environment that encourages reporting in all hospital settings (floors, emergency department, and ICU) so residents receive a consistent message when they intend to report	Beliefs about consequences; Reinforcement; Environmental context and resources; Social influences; Behavioral regulation
	Reinforcement	Spotlight system-level changes that occur due to event reporting to reinforce reporting efficacy and the potential to improve the work environment	Reinforcement; Optimism; Beliefs about consequences; Behavioral Regulation
	Emotion	Provide immediate (possibly automated) responses to event reports acknowledging receipt and that an investigation will be initiated if appropriate; this provides immediate positive reinforcement	Beliefs about consequences; Optimism; Behavioral regulation
		Train residents in error disclosure to patients and families; include filing an event report as part of this process	Social/professional role and identity; Knowledge; Skills; Intentions; Social influences; Behavioral regulation

COM-B, capability, opportunity, motivation system; ICU, intensive care unit; TDF, Theoretical Domains Framework.

contains resident identified interventions that were effective in encouraging reporting, mapped to the relevant domains of the TDF and organized as they apply to the Capability, Opportunity, Motivation system. Many of the identified interventions address multiple domains of the TDF.

Many of our findings provide concrete strategies for implementing the largely hypothetical reporting interventions described in the literature. Previous research suggests that formal safety education encourages reporting.^{7,29} Our study illustrates that engaging administrators and patient safety staff in educational sessions provides psychological safety to residents and decreases power distance between reporters and administrators, both of which should increase reporting.^{30,31} Providing feedback on reporting outcomes in this forum is simple to do and reinforces future reporting. Teaching residents about the investigative process, and involving front-line providers such as trainees in the investigation, provides transparency and is a way to evolve further event reporting into “a process of social and participative learning rather than a mechanism of data collection and analysis.”³² It is worth noting that the MP residents, while exposed to the same education as the pediatric residents, endorsed reporting behaviors more similar to their IM colleagues. This result implies that education, in and of itself, is not adequate to encourage reporting without the presence of a consistent patient safety culture. The TDF framework of behavior change supports this by recognizing knowledge and procedural skills as only 2 of the 14 domains that ultimately contribute to an individual changing their behavior.

A lack of faculty role models and champions is a frequently cited barrier to implement patient safety interventions.^{7,16,33} The solution at PED, where attendings ask residents if any patient safety events occurred overnight, is a simple intervention that provided a cognitive comfort and structure for all involved, without requiring extra training for faculty.

Residents stated that disclosing errors to families encouraged reporting and helped them overcome feelings of guilt. This reflection is a prominent theme in the literature focused on ways in which physicians can develop wisdom from errors.³⁴ By training residents in error disclosure and encouraging them to talk to peers, patients, and mentors about adverse events, it is hoped that we can encourage more trainees to learn from errors, as opposed to stagnating in them.

Our focus groups showed a statistically significant difference in gender distribution, with the pediatric focus groups having a higher proportion of females. This result is in line with national demographic trends for pediatric residents.³⁵ There is a lack of data about the impact of gender on adverse event reporting. It is possible that this gender difference may explain some of the reporting differences between pediatric and IM residents, although it would not explain the MP residents' qualitative accounts of differing behavior based on what hospital they are

rotating at, which were consistent among all group members regardless of gender. Gender differences in resident reporting behavior are an area for further research.

Our study has limitations. Although our participants represent multiple specialties and rotate at several different hospitals, they are all from the same healthcare system. Some facilitators may not transfer to, or be feasible to implement, in other healthcare contexts. Our participants were volunteers, which introduces the risk of selection bias. We aimed at limiting this by encouraging residents with a variety of event reporting experience to participate. Finally, residents' qualitative accounts of interventions to increase reporting are no substitute for data-driven quantitative analyses showing which interventions lead to statistically significant and sustained increases in reporting. Although the data from PED²¹ provides a good starting point, further quantitative studies focusing on specific interventions are needed to show more definitively the effect of these strategies. Future studies could implement one of the suggested interventions from Table 2 at other training hospitals to look for increases in reporting rates or decreases in adverse events. Another unanswered question is whether the cultural differences seen in our study are due to the culture of PED or are more representative of some inherent difference between pediatricians and residents who choose other specialties. Gathering data about reporting attitudes and behaviors of pediatric residents at other institutions and comparing them to other specialties at the same institutions could help to delineate this distinction.

Our study provides concrete strategies that residents identified as facilitating adverse event reporting and which align with a validated framework of behavioral change. Similar institutions can implement these strategies to increase resident event reporting. By educating residents about reportable events, engaging them through a transparent investigation process, providing a culture that showcases faculty and administrative role models, and training residents in disclosure to families, institutions can build a culture that encourages reporting and in which residents are engaged participants in finding solutions to improve the care provided to patients. When immersed in this environment, residents will hopefully internalize the goals of constant personal and system improvement and carry this forward in their careers.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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